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AUTHOR Kunert, Kenneth M.
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ABSTRACT

The limited success in predicting academic achievement by the use of personality factors may be attributable to failure to delimit sufficiently the nature of the group being predicted, resulting in subtle differences lying hidden in the remaining random variance of the procedures. This study attempted to enhance prediction by a more precise identification of the subjects for whom achievement is being predicted. A sample of 250 college freshman males was used to develop a prediction schedule. Predictions of academic success, based on the criterion of grade point average (GPA), were made on the basis of a clinical profile interpretation of the four clusters of scales on the California Psychological Inventory (CPI). Predictions were made by a gating process through which the predictions arrived at in each succeeding cluster of scales were used to refine the prediction level assigned in the preceding cluster(s). An attempt was made to quantify this process of clinical prediction using an experimental group of 20 and a replication group of 10. The results of the experimental group were analyzed and a correction formula developed. The distribution of predictions and G.P.A. were skewed in both groups. Prediction in the experimental group was improved by the correction factor but not in the replication group; the results are enigmatic and further investigation is necessary. Some possible explanations are suggested. (LR)

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USE OF PROFILE ANALYSIS IN PREDICTING ACADEMIC ACHIEVEMENT[1]

Kenneth M. Kunert

University of Detroit

Although personality factors are generally believed to be an important influence on academic achievement, only limited success has been achieved in using them as predictors. Gough (1964a, 1964b) and Holland (1959, 1960) have had some success, particularly in using multiple-regression equations with the scales of the California Psychological Inventory. Heilbrun (1963) had some success using configural interpretation of the Edwards Personal Preference Schedule, but it was minimal. The present study began with the assumption that the previous limitations of success have been a result of failing to sufficiently delimit the nature of the group being predicted, hence the necessary subtle differences have been hidden in the remaining random variance of the procedures. This study attempted to enhance prediction by a more precise identification of the Ss whose academic achievement was to be predicted by personality factors.

Method

Subjects. The Ss for this study were 250 freshman males in their first semester at the University of Detroit. They comprised 67% of the male day students in the Arts and Science College. They were given the Maudsley Personality Inventory, the Otis Quick Scoring Intelligence Test, and the California Psychological Inventory. The Ss were assigned to one of the nine cells of a contingency table based on the interrelation of their scores as high, average, or low on the Maudsley (scores of 21 to 35) and on the Otis (scores of 120 to 125, the 35th to 65th percentiles for this sample). Predictions of academic success, based on a criterion of grade point average (GPA), were made on the basis of a clinical profile interpretation of the four clusters of scales on the California Psychological Inventory (CPI).

Prediction schedule. A person would be predicted to get a certain GPA in accord with the cluster scores which were derived by getting the mean T score for the scales falling within each of the four scale groupings of the CPI. These mean T scores are referred to as E' or evaluation scores hereafter. Predictions were made by a gating process through which the predictions arrived at in each succeeding cluster of scales were used to refine the prediction level assigned in the preceding cluster or clusters of scales. Most emphasis, however, was placed on the first two clusters or sets of scales.

Interpretation principles. Since these Ss all fell in the average range of the IQ scores and of the Extraversion-Introversion scores,

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a constancy of ability and personality directedness was formed in which the predictions from the CPI were made. The first set of six scales of the CPI (Dominance, Do; Capacity for Status, Cs; Sociability, Sy; Social Presence, Sp; Self-acceptance, Sa; and Well-being, Wb) deal with "measures of poise, ascendancy, and self-assurance [Gough, 1964b, p. 57." For the person of average quality scores as tested here, a very high score on this set of scales would represent a person who is overly attracted to involvement in nonacademic activities and projects. It was hypothesized that his academic success would be depressed by too great an involvement since he is not able to so split his efforts.

It was predicted that the moderately high scoring person, however, would make good use of his capabilities because his strong self-acceptance and self-assurance provide the self-esteem and motivation to make him want to do well. In contrast, the moderately low scoring person on this set of scales because of his doubts about his self-acceptance and self-assurance would want to prove himself in an area in which he can best produce which would be in his studies. Hence he also would make good use of his abilities.

The person with an average score on this first set of scales would do average work since it is assumed there are no extraneous factors to motivate him to do superior work or to work below his ability. The person with a very low EV score would do poorly because he is unaccepting of himself and of his abilities.

The second set of six scales (Responsibility, Re; Socialization, So; Self-control, Sc; Tolerance, To; Good Impression, Gi; and Communality, Cm) are referred to as "measures of socialization, maturity, and responsibility [Gough, 1964b, p. 57." These scales are summed to determine their EV score, and then this is applied to the data of the first set of scales to further refine the average IQ and Extraversion-introversion person. The person scoring very high is seen as being well organized and goal directed, although he is somewhat rigid. Such a score positively modifies the prediction of Set I; whether he will achieve high or moderately high grades will depend on the last two sets of scale values. The moderately high person is also well organized and goal directed, but he is more flexible and creative. He also will be a high or moderately high achiever with relation to the scales of Set I.

The average EV score on these scales interacts strongly with the prediction of Set I leading to a prediction of low average achievement when the EV values of Set I are very high or very low and to average or slightly better than average achievement when the EV values of Set I are moderately high or moderately low. Moderately low scores and low scores on this set present a person who lacks organization and determination. He will be seen doing his best if he is average on Set I; if moderately high or high on Set I, he will dissipate his efforts and not do too well, and if low or moderately low there, he will be either a low average or an underachiever in his grades.

The third set of three scales (Achievement via Conformance, Ac; Achievement via Independence, Ai; and Intellectual Efficiency, Ie) are

seen as "measures of achievement potential and intellectual efficiency [Gough, 1964b, p.5]," and the last set of three scales (Psychological-Mindedness, Py; Flexibility, Fx; and Femininity, Fe) which are "measures of intellectual and interest modes [Gough, 1964b, p. 5]" are used to implement and modify in a general way the predictions of Sets I and II. High and moderately high EV values on Set III tend to implement moderately high and high achievement predictions. At the very least they would upgrade low predictions from Sets I and II and verify predictions of high achievement. Average scores would tend toward a prediction of average success since the individuals are using their abilities fairly well, and if there are no negative signs from the other sets of scales, they should achieve moderately high or average grades. Low or moderately low scores on Set III would depress higher achievement predictions and affirm the lower achievement predictions.

In Set IV, very high or very low EV scores are seen as leading to dissipation of effort and hence would tend to depress higher predictions based on the preceding sets of scales. Moderately high or average EV values would give a sense of stability and should foster positive predictions and lessen somewhat the severity of predictions of underachievement. Moderately low EV values on this set would tend to depress predictions of average or high achievement and enhance predictions of moderately low or low achievement.

Prediction is made in four steps with each step refining the level of prediction tentatively made on the bases of the sets of scales previously considered. An attempt has been made to try to quantify the process of clinical prediction based on the personality traits measured by the CPI.

Prediction. The Ss were divided into an experimental and a replication group. Twenty males were placed in the experimental group and 10 in the replication group. The EV values for each set of scales were computed and the interpretation schema devised. The author and an assistant studied the method of interpretation and independently made predictions for all 30 Ss. Rater reliability for the predictions was .91.

After all Ss were predicted, the results for the experimental group were analyzed. After this, a correction formula was devised from the misses of the predictions to see if this would improve the results in the replication group which would be analyzed in terms of the original predictions and of the "corrected" predictions. It should be noted that the groups are not random due to the constrictions placed on the Ss of being within the average range on the Maudsley and Otis tests.

Criterion. Evaluations were made for the first semester, the first two semesters, and finally the first four semesters the Ss were in college. The criterion for each evaluation was the grade-point average attained by S. Statistical analysis was accomplished by treating the five classifications of prediction and of actual grade point averages as numerical categories with high achievement being given a score of 5 and low achievement a score of 1 and in order each of the

other categories were given scores of 4, 3, and 2, respectively. Correlations were computed to determine the success of the predictive system using the Pearson product moment correlation.

Results

Although Ss were randomly assigned to the experimental and replication groups, the distributions of predictions and GPAs were quite skewed in the two groups.

These differences in the makeups of the groups had an effect on the success of the predictions both in terms of the ones that used the basic rules and the predictions that applied the correction formula results. This divergence among the successes in prediction for both groups in both approaches was evaluated by looking at the order of success in prediction which was best for low levels of achievement.

The correction factor greatly improved the predictions in the experimental group from which it was derived. It did not, however, particularly help the replication predictions. This, however, may be due to the fact that this group's distribution was so skewed. Two formulas were developed, one to correct for false low predictions and the other to correct for false high predictions. Both were applied to all Ss in making the "corrected predictions." The formula for the false low predictions was as follows: $(\langle Sa-Sc\rangle+\langle Re-Cm\rangle+\langle Sc-Cm\rangle+\langle Sc-Fe\rangle)$. A cut-off of 75 was established with scores above 75 signifying that the prediction should be upgraded. The formula for false high predictions was as follows: $(Re + Sc + Cm + Fe)$. This used a T total of 220 with values above 220 necessitating a lowering of predictions. The terms in the formulae refer to the scale names of the CPI, mentioned previously. As this formulation is quite tentative, it will not be discussed further.

Discussion

The results of this study are quite enigmatic and certainly raise more questions than they solve. It would appear that this combination of clinical and loosely constructed actuarial approach (developing Set scores for the CPI and classifications, etc., of GPA) does have value for picking out those Ss who will not do as well as they are expected to do in college. This, in itself, could be of use to counselors.

The limitations imposed on the sample by first classifying Ss by IQ and by Extraversion-Introversion scores and also by trying to perform a series of predictions within a .56 range of GPA have, perhaps, asked too much preciseness from a personality instrument such as the CPI. Perhaps, too, the theoretical basis for interpreting the CPI needs further honing before the full range of GPA can be adequately predicted.

References

Gough, H. G. Academic achievement in high school as predicted from the California Psychological Inventory. Journal of Educational Psychology, 1964, 55, 174-180. (a)

Gough, H. G. Manual for the California Psychological Inventory. Palo Alto, Calif.: Consulting Psychologists Press, 1964. (b)

Heilbrun, A. B., Jr. Configural interpretation of the Edwards Personal Preference Schedule and the prediction of academic performance. Journal of Personnel Guidance, 1963, 42, 264-268.

Holland, J. L. The prediction of college grades from the California Psychological Inventory and Scholastic Aptitude Test. Journal of Educational Psychology, 1959, 50, 135-142.

Holland, J. L. The prediction of college grades from personality and ability variables. Journal of Educational Psychology, 1960, 51, 245-254.

Footnotes

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A

APPENDIX

USE OF PROFILE ANALYSIS IN PREDICTING ACADEMIC ACHIEVEMENT

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Note: (a) Table 1 relates to Prediction Schedule, p. 1 of text
(b) Table 2 relates to Interpretation Principles, pp. 1-3 of text
(c) Table 3 relates to Paragraph 1 under Results, p. 4 of text
(d) Table 4 relates to Paragraph 2 under Results, p. 4 of text
(e) Table 5 relates to Paragraph 2 under Results, p. 4 of text

TABLE 1

Prediction and Criterion Measures of College Achievement		
Achievement Levels	CPI Predictors Mean T Values	Grade Point Average Predicted & Actual
Very high	56 and above	2.76 and above
Moderately high	53 to 55	2.61 to 2.75
Average	48 to 52	2.41 to 2.60
Moderately low	45 to 47	2.21 to 2.40
Very low	44 and below	2.20 and below

TABLE 2

Examples of Prediction from CPI							
Subject	Set	Pred	Set	Pred	Set	Pred	Set	Pred
	I		II		III		IV	
A	40.5	low	45.1	low	39.6	low	54.3	low
B	58.5	ave.	60.8	M.high	59.6	high	57.6	high
C	50.1	ave.	48.0	ave.	41.6	low	50.7	M.low

TABLE 3

Distribution of Predicted GPAs and Achieved GPAs

GPA Schedule	Predicted	Semester I	Semester I - II	Semester I - IV
A. Experimental Group N = 20				
2.76 and above	2	2	4	6
2.61 to 2.75	4	4	2	1
2.41 to 2.60	2	2	2	1
2.21 to 2.40	6	1	3	2
2.20 and below	6	11	9	10
B. Cross-validation Group N = 10				
2.76 and above	2	2	2	1*
2.61 to 2.75	0	0	0	0
2.41 to 2.60	0	1	1	0
2.21 to 2.40	1	0	0	2
2.20 and below	7	7	7	6

* One S with a 2.93 GPA did not return to school

TABLE 4

Correlations between Predicted GPAs and Achieved GPAs

Groups	Grade Periods		
	Semester I	Semester I - II	Semester I - IV
A. Simple Rules			
Experimental	.13	.31	.03
Cross-validation	.44	.51	.67*
B. Rules plus correction formula			
Experimental	.71**	.86	.47
Cross-validation	.40	.40	.74*

* One S with 2.93 GPA did not return in 2nd year

** Contaminated: correction formula from group

TABLE 5

Agreements and One Category Misses in Predicting GPAs for Experimental and Cross-validation Groups

GPA Schedule	Grade Periods								
	Semester I			Semester II			Semester IV		
	P	E.P.@	±1cl	P	E.P.	±1cl	P	E.P.	±1cl
2.76 and above	2	0	0	2	0	0	2	0	1
	2	*1*	*0*	*2*	*1*	*0*	*2*	*1*	*0*
2.61 to 2.75	4	1	0	4	0	2**	4	0	2**
	0	-	-	*0*	-	-	*0*	-	-
2.41 to 2.60	2	0	1	2	0	1**	2	0	0
	0	-	-	*0*	-	-	*0*	-	-
2.21 to 2.40	6	0	4**	6	2	2**	6	2	2
	1	*0*	*0*	*1*	*0*	*0*	-	-	-
2.20 and below	6	4	0	6	4	0	6	4	0
	7	*5*	*0*	*7*	*5*	*0*	*7*	*5*	*2*
Total Overall	20	5	5	20	6	5	20	6	5
Total 2.40 and below	*10*	*6*	*0*	*10*	*6*	*0*	*9*	*6*	*2*
Total 2.40 and below	12	4	4**	12	4	4**	12	6	2
	8	*5*	*0*	*8*	*5*	*0*	*7*	*5*	*2*

* Numbers in italics represent the cross-validation sample

** One S of this group fell one level above prediction

@ E.P. refers to number of Ss who achieved (equaled) the predicted GPA.